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FURTHER OBSERVATIONS ON THE SIGNIFICANCE OF  
WILD BIRDS AS HOSTS OF IXODES TICKS IN THE  
TOMSK FOCUS OF TICK-BORNE ENCEPHALITIS

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In the article published in Volume 8 of the Transactions of the Tomsk Institute of Vaccine and Serum Research, entitled "Wild Birds--Hosts of Tick Larvae and Nymphs in the Tomsk Focus of Tick-Borne Encephalitis," we discussed the results of our observations during 1955.

In the present report we summarize the results of our observations in 1956.

Our observations were made in the environs of the following villages: Zavarzino, Trubochevo, Kutashovo, and Todionovo, Tomsk District. We secured our first bird specimen on April 23rd and our last one on August 21st. One hundred and forty-six wild birds were brought down during the spring and 337 during the summer, 83 of them being trapped bank swallows (Riparia riparia L.). We brought down a total of 438 birds from April to August, 1956, representing 32 species. The following 13 species of birds were found to be hosts to the larval and nymph stages of the wood tick; tree pipit (Arthus trivialis L.), field fare (Turdus pilaris P.), thrush (Turdus ericetorum Tur.), song thrush (Turdus musicus L.) yellowhammer (Emberiza citrinella L.), white capped bunting (Emberiza leucocephala Omel.), spring wood warbler (Phylloscopus trochilus L.), northern wood warbler (Phylloscopus borealis Blas.), magpie (pica pica L.), European starling (Sturnus vulgaris L.), Arctic rosy finch (Leucosticte arctoa Pall.), finch (Eringilla coelebs L.), and European bullfinch (Purruhula pyrrhula L.).

We were also able to find a substantial number of larvae, nymphs, and imagoes of Ixodes crenulatus ticks on the bank swallow.

In 1956, the first wood tick nymphs were found on birds on May 3rd. The birds brought down in April and May that had ticks on them

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are listed in Table 1.

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TABLE 1

Kinds of birds and number of metamorphosis stages of the wood ticks parasitic on them during April and May, 1956.

Name of bird	No. shot down	No. carrying ticks		No. ticks on birds			Frequency of occurrence			Abundance
		L	N	T	L	N	T	L	M	
Tree pipit	22	✓	-	2	✓	-	-	2	-	9.0 - 0.09
Whitecapped bunting	19	-	1	-	-	1	-	-	5.0 - 0.05	
Thrush	2	-	1	-	-	7	-	-	50.0 - 3.5	
European Bullfinch	4	-	2	-	-	6	-	-	50.0 - 1.5	
Northern wood warbler	4	-	2	-	-	3	-	-	50.0 - 0.75	

Note: L-Larvae; N-nymphs; I-imagoes

Besides the birds listed in the table, we brought down and examined 11 fieldfares, 22 yellowhammers, 6 titmice, 4 great spotted woodpeckers, 4 long-tailed titmice, 5 Siberian chickadees, 16 chickadee tits, 2 great titmice, 2 nutcrackers, 1 cuckoo, 2 vertisheikas /UNIDENTIFIED-TRANS./, 3 spruce crossbills. No wood ticks were found on any of these birds.

Analysis of the above data indicates that only nymphs feed on the birds in springtime, no larvae being on the birds during this period. At any rate, we did not find any. The percentage frequency and abundance of nymphs on the birds were fairly high. For instance, these parameters were as follows for the tree pipits: 9.0% frequency and 0.09 abundance. The corresponding figures for the whitecapped butings were 5.0% and 0.05, for the thrushes 50.0% and 3.5 for the European bullfinches 50.0% and 1.5, and for the northern wood warbler 50.0% and 0.75.

Figures showing the importance of birds as hosts to larvae, nymphs, and imahoes during the summertime are given in Table 2.

TABLE 2

Number of stages of metamorphosis of the wood tick and of ticks of the Ixodes crenulatus group that were parasitical on wild birds in June-August, 1956.

<u>Name of bird</u>	<u>No. shot down</u>	<u>No. carry-ing ticks</u>			<u>No. ticks on birds</u>			<u>Frequency of occurrence</u>					
		L	N	I	L	N	I	L	N	I	L	N	I
Tree pipit	34	13	20	-	40	40	-	36.0	59.0	-	2.6		
Fieldfare	77	18	46	-	77	195	-	23.0	59.0	-	3.7		
Thrush	3	1	1	-	2	3	-	33.0	33.0	-	1.7		
Song thrush	10	4	2	-	23	5	-	40.0	20.0	-	2.8		
Yellowhammer	12	-	2	-	-	2	-	-	17.0	-	0.17		
Spring wood warbler	4	-	1	-	-	1	-	-	25.0	-	0.25		
Magpie	3	-	1	-	3	-	-	-	33.0	-	1.0		
European starling	4	-	2	-	-	3	-	-	50.0	-	0.75		
Arctic rosy finch	2	-	1	-	-	1	-	-	50.0	-	0.5		
Finch	6	-	4	-	-	2	7	33.0	67.0	-	1.5		
Common oriole	5	-	-	-	-	-	-	-	-	-	-		
Bank swallow	83	2	10	27	4	92	36	2.4	12.0	33.0	0.6		

Note: Ticks of the Ixodes crenulatus group were found on the bank swallows.

Besides the birds listed in Table 2, we brought down and examined 11 chickadee tits, 9 Siberian chickadees, 12 long-tailed titmice, 1 white-capped bunting, 3 titmice, 19 great spotted woodpeckers, 3 linnets, 2 white wagtails, 4 spruce crossbills, 2 reed crossbills, 2 crows, 3 stonechats, 21 jays, and 2 kingfishers. No ticks were found on any of these birds.

These figures indicate that only five species of birds act as hosts to the larvae of the wood tick. The frequency of occurrence and the abundance of wood tick larvae and nymphs on wild birds in 1156 were as follows: 44.0% and 1.5, respectively, on tree pipits; 59.0% and 2.0 on fieldfares; 20.0% and 1.7 on thrushes; 50.0% and 2.8 on song thrushes; and 26.0% and 0.6 on finches.

Frequency of occurrence and abundance of Ixodes crenulatus ticks on bank swallows were 36.0% and 0.63, respectively.

Together with these parameters we endeavored to trace the dynamics of the number of ticks on birds during the different hunting seasons. We found that the frequency of occurrence was 3.0% during the first half of May, and 9.0% during the second half. The frequency of occurrence rose to its maximum, 81.0% during the first half of June, after which the number of ticks on birds began to drop off sharply. Thus, frequency of occurrence was 50.0% during the second half of June, 27.0% during the first half of July, 16.0% during the second half of July, and 14.0% during the first half of August. The rise and fall of tick abundance on birds paralleled the course frequency of occurrence. Thus, the abundance was 0.1 during the second half. It totaled 0.6 during the first half of July, 0.7 during the second half, and dropped to 0.3 during the first half of August.

The ticks found on the birds were examined to determine their plumpness. We found that 66 out of a total of 136 wood tick larvae collected were satiated, while 153 out of a total of 285 nymphs of this species collected were satiated. Of the Ixodes crenulatus ticks in various stages of metamorphosis collected from the bank swallows, 39 were found to be satiated.

These findings demonstrate that birds are among the principal hosts of wood tick larvae and nymphs, as well as of the larvae, nymphs, and imagoes of the Ixodes crenulatus tick in the natural conditions of the Tomsk tick-borne encephalitis focus.

#### SUMMARY

1. In the natural conditions of the Tomsk focus of tick-borne encephalitis the following are active hosts of wood tick larvae and nymphs: the tree pipit, the fieldfare, the thrush, the song thrush, the yellowhammer, the whitecapped bunting the spring wood warbler, the northern wood warbler, the magpie, the European starling, the Arctic rosy finch, the finch, the European bullfinch.
2. A large number of the larvae, nymphs, and imagoes of Ixodes crenulatus ticks was found on the bank swallow.
3. Ticks appeared on the birds during the first half of May, their number reaching a maximum at the middle of June and dropping to a minimum by the middle of August.

#### NOTE:

The following minor discrepancies appeared in the printed text from which the English translation was made:  
Page 1, line 12. According to internal evidence, the total of the April-August period is 483.  
Table 2. Magpie and Finch: data on birds carrying ticks and stages of ticks are in disagreement. See also p. 4, second paragraph.